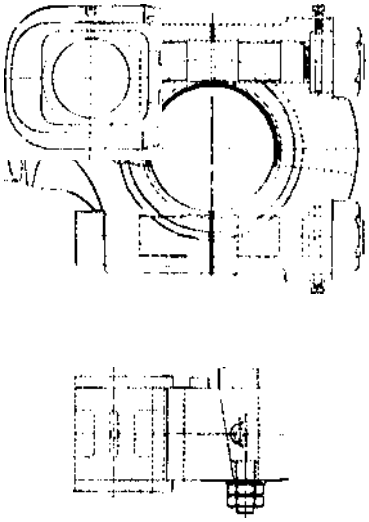
both tapers being towards the centre line. The split collar is forced into a conical hole in the side of the crossheacl by a nut on the end of the pin, thus tightly gripping the parallel part of the latter.

The pressure allowed upon the bearing surface of the gudgeons or pin may be from 1000 to 1200 Ib. per square inch. The maximum pressure on the guides due to the obliquity of the connecting-rod may be 50 to 60 Ib. per square inch.

Connecting-rods.--The marine pattern is often used, especially for the crank-pin end, but the rod with solid ends is common. Fig. 13 shows a rod by Messrs. Robey & Co. suitable for the erosshead illustrated



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by fig. 12. The brasses at: the erosshead end are adjusted by a wedge and screw.

Crank and Crankshaft.-•-The journal of the crankshaft is subjected to both twisting and bending. In overhung cranks the twisting moment does not exceed *piston load X crank radius,* and the bending moment is taken as *piston load X distance between centre of crank pin and the centre of journal.* The greatest twisting moment occurs when the crank and connecting-rod are at right angles or thereabouts, but the greatest bending moment will occur when the steam load is greatest. The equivalent twisting moment should be taken for several positions to find its maximum, either from an

actual or from an assumed indicator diagram, and the stress calculated from that maximum. The formula for the equivalent twisting moment is T_e = M + x/M^2 + T^2, where M is the bending moment and T the twisting moment, taken as explained above. The maximum shearing stress is then/ = TJo-igGd^3, where *d* is the diameter of the journal. A stress of 8000 to 9000 Ib. per square inch may be allowed. Sometimes the equivalent bending moment is used, and is found from M_e = JM + *k*|/*M** f T^2,